REMARKS

Reconsideration of the above-identified application in view of the amendments above and the remarks following is respectfully requested. Claims 113-122,144-158,163 and 164 have been withdrawn. Claims 1-109, 113-142 and 144-164 are now pending in the application.

Claims Objections

In section 1 of the report, the Examiner is objected to Claims 68, 72-77, 90-109, 123-142, 159 and 162

because of a number of informalities. Applicant amended these claims according to the Examiner's suggestions and objection in section 2 of the report. In addition, Applicant made a number of respective amendments for consciousness and clarity. Applicant believes that this rejection is moot as the pointed informalities were removed according to the description of the present application.

Rejections under 35 U.S.C. § 103(a)

Claims 1-6, 8, 9, 11-22, 24, 31-47, 50-52, 54-69, 71, 78-90, 93, 94, 96-109, 123-131, 133, 134, 136-142, 159, 160, 163 and 164, are rejected under 35 U.S.C. 103(e) as being unpatentable over US Patent No. 6,628,984 of *Weinberg* (hereinafter: "*Weinberg*") in view of Tekalp et al (High-Resolution Image Reconstruction From Lower; Resolution Image Sequences and Space-Varying Image Restoration. *IEEE International Conference on Acoustics, Speech and Signal Processing* p. 169-172. March 1992) (hereinafter: "*Tekalp*").

Applicant respectfully disagrees, mainly as *Tekalp*, which only teach 2D reconstruction by combining data from successive frames, cannot be used for improving resolution of tomographic probe. However, in order to expedite the examination, Applicant amended claim 1 to include the following features (underlined):

"1. (Currently Amended) A system for reconstructing a <u>three dimensional (3D) image</u> of at least a portion of radioactivity emitting source in a system-of-coordinates, the system comprising:

a radioactive emission probe <u>set to collect a plurality of radiation detections at a plurality of positions in different planes around the radioactivity emitting source</u> ;

a position tracking system, being in communication with the radioactive emission probe and configured for tracking a position of the probe in the system-of-coordinates; and

a data processor which receives a plurality of image data inputs in a first resolution from the radioactive emission probe, said image data inputs being of the radioactivity emitting source in the system-of-coordinates using said plurality of radiation detections received from the probe, said data processor receiving said plurality of positions of the probe from the position tracking system, said data processor processing said data inputs to create a <u>3D image</u> of said portion in a second resolution higher than said first resolution;

<u>wherein said data processor iteratively reconstructs said 3D image from said plurality of radiation detections according to said plurality of positions</u>. "

Basis for the amended features, for example the reconstruction of 3D image, <u>the plurality of positions of the probe in different planes around the radioactivity emitting source, and the iterative reconstruction of the 3D image according to the plurality of positions,</u> is provided, *inter alia*, in description of FIGs. 5A-5F and 9A-9C, for example in paragraphs [0129] – [0150], [0175], [0185] and in paragraphs [0384]-[0385] and [0387] of the present application. The iterative construction is described, *inter alia,* in FIG. 52A and in related paragraphs [0589]-[0594] of the present invention.

Amended claim 1 now recites a method for *reconstructing a <u>three dimensional (3D)</u> image of at least a portion of radioactivity emitting source having a resolution which is higher than the resolution of the image data inputs imaging the at*

least a portion of the radioactivity emitting source. None of the cited references or any combination thereof, teaches or implies such a 3D imaging process, *inter alia,* as none of the cited references teaches or implies how to covert low resolution image data input to a 3D image with higher resolution, for example as recited in amended claim 1.

The Examiner argues that it would have been obvious to one of ordinary skill in the art at the time of invention to have modified *Weinberg* to include the steps and elements of *Tekalp* for combining multiple low-resolution input datasets to produce a single high-resolution output, in order to improve the quality of the output image as taught by *Tekalp*. Applicant respectfully disagrees. *Weinberg* teaches a tomographic imaging system deriving a 3D representation of a source. *Tekalp,* on the other hand, teaches a reconstruction of a high-resolution two dimensional (2D) image from a number of lower-resolution (2D) frames. The 2D reconstruction process of *Tekalp* cannot be adjusted to reconstruct a 3D image, *inter alia,* as it is based on global subpixel displacement detection, see Abstract and the left column of page III-170 of *Tekalp*. Such displacement detection ignores the technological challenges which have to be taken into account when reconstructing a 3D space. For example, a subpixel displacement disregards changes in depth and does not allow combining information from different planes. Moreover, the equations taught in *Tekalp* are two dimensional equations which cannot be used for 3D reconstruction. Thus, *Tekalp*, which teaches 2D reconstruction cannot be combined with *Weinberg* to teach how to combine multiple low-resolution input datasets to produce a single high-resolution output for 3D presentation. As described above, Applicant amended claim 1 to emphasize further that the recited imaging system reconstructs spatial data, a 3D image, and not 2D data, such as a 2D image. Therefore, we conclude that an artisan having common sense at the time of the invention would not have reasonably considered combining the 2D reconstruction taught by *Tekalp* within an existing imaging system for generating 3D presentations, as taught by *Weinberg,* in the manner suggested by the Examiner.

Moreover, Applicant amended claim 1 to emphasize that the claimed system reconstructs a 3D image based on plurality of radiation detections received from the probe when it is at <u>different positions in different planes</u> around the radioactivity

emitting source. *Tekalp,* which teaches how to reconstruct a high resolution image from successive frames which are uniformly shifted, see the Abstract of *Tekalp*, is limited to reconstruct data that is gathered from a camera that is located on a common plane. *Tekalp*, which only combines successive frames at a common plane, cannot be used to reconstruct data from different planes.

In addition, Applicant amended claim 1 to emphasize that 3D image is reconstructed by iterative reconstruction process which takes into account the positions of the probe as monitored by the position tracking system. *Weinberg* teaches a position sensor, this sensor is not used for reconstruction of images. The position sensor of *Weinberg* is used for *determining the position and angulation of the detector in relation to a gamma ray emitting source*, see column 2, lines 30-25 of *Weinberg*. However, *Weinberg* does not teach how to use this information for reconstruction. *Tekalp*, which focuses on 2D reconstruction, is silent about how to use position data for reconstruction.

As none of the cited references or any combination thereof teaches how to combine <u>low resolution images received from different planes</u> to create <u>a high resolution 3D image</u>, we find no suggestion to combine the teachings and suggestions of *Tekalp* and *Weinberg* as advanced by the Examiner, except from using Appellant's invention as a template through a hindsight reconstruction of Appellant's claims. Factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of argument reliant upon *ex post* reasoning, see *KSR Int'l Co. v. Teleflex Inc.,* 127 S. Ct. 1727, 82 USPQ2d at 1397.

In view of the above, it is submitted that amended claim 1 is patentable over the cited references, at least for the reasons described above. Dependent claims 2-6, 8, 9, 11-22, 24, 31-42, and 159 are consequently allowable as being dependent on an allowable main claim. The arguments made above in respect of the novelty of claims 1 apply *mutatis mutandis* to independent claims 43, 90, and 123. Based on these arguments, Applicant asserts that the independent claims 43, 90, and 123 are allowable main claims and dependent claims 47, 50-52, 54-69, 71, 78-90, 93, 94, 96-109, 123-131, 133, 134, 136-142, and 160 are consequently allowable as being dependent on an allowable main claim.

All of the issues raised by the Examiner have been dealt with. In view of the foregoing, it is submitted that Claims 1-109, 113-142 and 144-164, which are pending in the application, are allowable over the cited references. An early Notice of Allowance is therefore respectfully requested.

Reconsideration and allowance of the claims herein area respectfully requested.

Respectfully submitted,

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